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ABSTRACT

Almost every state is "imposing" academic standards. Helping students to meet those standards is a key task for teachers and school administrators, as well as instructional systems designers. Thus, instructional designers in the K-12 environments are facing the challenge of using appropriately and effectively academic standards in their instructional systems design process. This paper offers some effective ways of handling academic standards in the instructional systems design process, together with examples. This paper is intended to encourage experts in both academic standards and instructional systems design to examine the role and influence of academic standards on instructional systems design processes and the subsequent outcomes. (Author)

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Incorporating Academic Standards in Instructional Systems Design Process

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Abstract

Almost every state is "imposing" academic standards. Helping students to meet those standards is a key task for teachers, school administrations, as well as instructional systems designers. Thus, instructional designers in K-12 environments are facing the challenge of using appropriately and effectively academic standards in their instructional systems design process. This presentation offers some effective ways of handling academic standards in the instructional systems design process together with examples. It is hoped that this presentation will encourage experts in both academic standards and ISD to examine the role and influence of academic standards on ISD processes and the subsequent outcomes.

1. Introduction

Many states are "imposing" academic standards which need to be addressed in instructional systems design (ISD) process and incorporating academic standards effectively becomes a crucial skill for instructional designers in K-12. This presentation examines effective ways of incorporating academic standards in ISD process. Examples of how academic standards can guide and help ISD process will also be discussed. Another goal of this presentation is to encourage experts in both academic standards and ISD to examine the role and influence of academic standards on ISD processes and the subsequent outcomes.

2. Defining terms

Academic standards in this presentation will refer to the official documents from the national, state department of education or local educational commission that define what each student should know and do in a core set of subjects. They are academic targets for students, teachers and parents to meet. *Proposed Academic Standards for Science and Technology* by Pennsylvania Department of Education is an example of such state-defined academic standards.

Instructional Systems is better known as Educational Technology or Instructional Technology. It is defined as "the theory and practice of design, development, utilization, management and evaluation of processes and resources for learning" (Seels & Richey, 1994, p.1, the AECT Definitions and Terminology Committee, 2000). Its ultimate purpose is to improve effectiveness and efficiency of human learning. Instructional systems design (ISD) in this article refers to the systematic process of planning instructional systems, specifically the process of analysis, design, development, implementation and evaluation of instructional programs.

3. Relationships between academic standards and instructional system design

Academic standards are constructed to give students a solid foundation in the basics and to provide consistent targets for students, teachers and parents. They allow schools to measure student achievement. They help parents, teachers, school administration and school districts follow the progress that students make from year to year. "Done right, aligned standards and assessments give us something that standards and curriculum objectives, by themselves, never delivered: the ability to see how well we are performing and how much we are improving." (Pennsylvania Department of Education, 2001. online: http://www.pde.psu.edu/standard/backgrnd.html)

The importance of academic standards has long been recognized in education. Studies related to academic standards range from the characteristics of good academic standards to their influence in facilitating educational reforms and students' achievements. Setting up good academic standards is important. However, how to help students to meet those standards are the real purposes. This is where the academic standards and ISD meet. According to the definition above, the ultimate purpose of ISD is to make the learning maximally effective and efficient. Therefore, in K-12 environments, the ultimate purpose of ISD is to help the students achieve those academic standards effectively and efficiently.

4. Incorporating academic standards in instructional systems design

All the academic standards should be measurable, applicable and clearly written. When applying the academic standards in instructional systems design, they might not be so either because of standards themselves or the limits of resources available to apply them. The author summarizes the following ways to incorporate academic standards appropriately and effectively in ISD. They are to be discussed in the four aspects (1) systemic approach in incorporating academic standards, (2) academic standards as ISD guide, (3) flexible use of academic standards in ISD, and (4) moving beyond academic standards.

4.1. Systematic approach of incorporating academic standards

The systemic approach in ISD refers to the way in which instructional systems designer takes every aspect of ISD into consideration in order to produce effective instructional programs. It should be differentiated from systematical approach. The systematical approach is linear, step-by-step approach while the systemic is integrated, holistic approach in ISD efforts (Banathy, 1996).

A systemic approach in incorporating academic standards in ISD process should take following into considerations and balance between what should be done and what could be done:

- Which academic standards should be included in the ISD programs that can help the students most?
- Which academic standards should be included in the ISD programs that are in alignment with the project rationale and goals, and student and school needs?
- Which academic standards should be included in the ISD programs according to the availability of resources (personnel and financial resources, equipment and facilities resources, technical and content support, and time constraints, etc.)?
- How much academic standards should be included in the ISD programs according to the availability of resources (personnel and financial resources, equipment and facilities resources, technical and content support, and time constraints, etc.)?

The systemic approach ensures the effectiveness and efficiency of incorporating academic standards in ISD.

4.2. Academic standards as the ISD project guide

Academic standards can be used as ISD project guide. Instructional systems designers can refer to academic standards to establish ISD project rationale and project goals. This is especially true in writing grant proposal for ISD project. In analyzing phase of ISD, academic standards can provide guidance and references on specific learning objectives for the ISD program. This ensures that contents of ISD programs designed and developed are right on the target by defining what the students are supposed to learn and help them to learn well to meet the standards. In implementing and evaluating of ISD programs, the academic standards may also provide instructional systems designer with what to assess or basis for what to assess. Many academic standards can provide yardsticks for both summative and formative evaluation in the ISD programs. The rubrics or criteria for assessment can be directly developed from the academic standards. All these help to increase the validity of the assessments involved in ISD programs.

To use academic standards as a guide appropriately, it is always advisable for instructional systems designers to consulting with subject matter experts and the schoolteachers who are going to use the ISD programs eventually in their classrooms. It is very important to make sure that you have reached a consensus in explaining and understanding the specific academic standards that the ISD program is to include. Otherwise, there is no way for the teachers to use the ISD program effectively if it conflicted with their beliefs and understanding.

4.3. Flexible use of academic standards in ISD

Academic standards are important to instructional systems designers and how to incorporate them appropriately in ISD process is crucial for those work in K-12 environment. Academic standards provide general guidance in terms of learning content for ISD programs. However, in most of the cases, they cannot be directly used as learning objective for ISD programs. A competent instructional designer should be able to use academic standards flexibly.

There are three effective ways of using academic standards without comprising their quality and quantity. They are (1) deriving learning objectives for a single ISD program unit from multiple standards, (2) deriving learning objectives for multiple ISD program units from single standard, and (3) deriving learning objectives for multiple ISD program units from multiple standards.

1. For a single ISD program unit, the learning objectives can be derived from multiple standards. (Please see **Example 1: Multiple standards for a single ISD program unit.**)
2. The learning objectives for multiple ISD program units can be derived from a single academic standard. (Please see **Example 2: A single standard for multiple ISD program units.**)
3. The learning objectives for multiple ISD program units can be derived from multiple academic standards. Although none of the ISD program units fully covers a single academic standard, the multiple units cover all the targeted academic standards and may overlap. (Please see **Example 3: Multiple standards for multiple ISD program units.**)

4.4. Moving beyond academic standards

Academic standards should be the guide and references for ISD rather than the obstacles and constraints. A competent instructional systems designer should not only be able to use them flexibly but also be able move beyond academic standards in ISD. This can be done mainly in two ways. First, ISD should not only aim at accomplishing the target standards but also aim at preparing the learners to achieve higher academic standards. For example, in designing a lesson of biology for the 5th grade students, instructional system designer should not only consider the present learning target but also prepare the students to achieve those academic standards in their future study. Maybe you could find that some of the academic standards for the 6th grade students can be partially incorporated in your design for the 5th grade.

Another way of moving beyond the academic standards in ISD process is to integrate academic standards of different subjects into your ISD programs whenever possible. For example, in designing computer-assisted lesson of biology, the academic standards of science and technology can be easily integrated together. In developing a lesson of environment protection, the academic standards in writing can be integrated together. For instance, in **Example 1: Multiple standards for a single ISD program unit,** the learning objectives for ISD program are derived from academic standards for 4th grade students. The academic standards are from different subjects of study (Environment and Ecology, and writing) and for different grades (grade 4 and grade 5). The integration of academic standards from different areas of learning would foster the learners' development in all fields of studies.

5. Conclusion

For instructional systems designers in K-12 environments, academic standards mean a lot. "The program rationale must be based on the academic standards, otherwise, we will never get the grant." "We have to cover these standards as required by the grant." "Derive program objectives according to the academic standards and also remember to assess the learners according to them. We need a report on that." Like it or not, these are common statements and actual practices of ISD in the field of K-12. The practical ways mentioned above can help instructional systems designers in K-12 incorporate academic standards appropriately and effectively in ISD process and help more students meet their academic standards.

Also, it is hoped that this article would bring more experts both in the fields of academic standards and instructional systems design to study the effective and efficient ways of incorporating academic standards in ISD processes and their subsequent outcomes. It is obvious that the efforts of study academic standards in ISD process will benefit a lot both students and teachers in K-12 education.

Example 1: Multiple standards for a single ISD program unit

Multiple Academic Standards	Learning Objectives for a ISD Program Unit

Academic Standards for Environment and Ecology (Pennsylvania Department of Education, 2001) 4.9.4 Grade 4 ***A. Know that there are laws and regulations for the environment*** • *Identify local and state laws and regulations regarding the environment* • *Explaining how the recycling law impacts the school and home* • *Identify and describe the role of a local or state agency that deals with environmental laws and regulations*	**Lesson Objectives derived from the academic standards** *1. Given examples of environmental laws and regulations, the student will be able to categorize them correctly (85%) into three main categories (Air, Water, and Pesticides and other pollutants).* *2. Student will be able to discriminate correctly (95%) between recyclable and non-recyclable items in their daily life both at school and home.* *3. The student will be able to describe in writing the following roles of a local or state environmental agency that deals with environmental laws and regulations.* *a. Monitoring environment* *b. Environmental law enforcing* *c. Gathering and sharing information on environment*
Academic Standards for Environment and Ecology (Pennsylvania Department of Education, 2001) 4.2.4 Grade 4 ***D. Identify by products and their use of natural resources*** • *Identify those items that can be recycled and those that cannot.*	
Academic Standards for Reading, Writing, Speaking, and Listening 1.4.5 Grade 5 ***B. Writing multi-paragraph informational pieces (e.g. essays, descriptions, letters, reports, instructions.)*** • *Include cause and effect.* • *Develop a problem and solution when appropriate to the topic* • *Use relevant graphics (e.g. maps, charts, graphs, tables, illustrations. Photographs).*	

Example 2: Single academic standard for multiple IDS program units

Single Academic Standard	Learning Objectives for Multiple ISD Program Units
Academic Standards for Sciences and Technology (Pennsylvania Department of Education, 2001) 3.3.4 Grade 4 ***A. Know the similarities and differences of living things*** • *Identify life processes of living things (e.g. growth, digestion, react to environment).* • *Know that some organism have similar external characteristics (e.g. anatomical characteristics; appendages, types of covering, body segments) and that similarities and differences are related to environmental habitat.* • *Describe basic needs of plants and animals.*	**Objectives for Unit One** *1. Given an example of living animal or a plant that student are familiar with, students will be able to clearly describe its life process by using concepts of growth, digestion, and its external characteristics.* **Objectives for Unit two** *2. Students will be able to describe the basic needs of plants and animals and explain how living things are dependent on other things—both living and nonliving—in the environment for survival by using examples that they are familiar with*

Example 3: Multiple academic standards for multiple IDS program units

Multiple Academic Standards	Learning Objectives for Multiple ISD Program Units
Academic Standards for Sciences and Technology (Pennsylvania Department of Education, 2001) 3.7.4. Grade 4 ***D. Use basic computer software.*** • *Applying operating system skills to perform basic computer tasks.* • *Apply basic word processing skills.* • *Identify and use simple graphic and presentation graphic materials generated by computer.* • *Apply specific instructional software*	**Objectives for Unit 1** *Given the category type of search engine, the students will be able to locate information needed to solve the given problems that are appropriate to their age by* • *Forming up appropriate questions* • *Identifying the key words to location information needed* • *Being selective (critical) towards information found online* • *Using the information founded to solve given problem* • *Using email format to communicate solutions*
Academic Standards for Sciences and Technology (Pennsylvania Department of Education, 2001) 3.7.4. Grade 4 ***E. Identify basic computer communication systems.*** • *Apply a web browser.* • *Apply basic electronic mail functions.* • *Use online searches to answer age appropriate questions.*	**Objectives for Unit 2** *1.Given student a business web site, the students will be able to identify correctly the basic components web site including* • *URL* • *Site title and site content (Navigation bars, contact information)* • *Description of the company (Name, address, company logo and contact information)* • *Products and services* • *Date of site information updated* *2. Students will be able to use graphic designing principles to evaluate the site design in terms of* • *Easy to read* • *Layout of website* • *Consistency in graphic presentation*
	Objectives for Unit 3 *Given a web design template, student will be able to design a business site for advertising company products and services by following graphic principles in unit 2.*

References

AECT Definition and Terminology Committee, 2000. Online: http://www.aect.org/Affiliates/National/Standards.pdf

Banathy, B. H. (1996). "Systems Inquiry and Its Application in Education, ch. 3" in Handbook of *Research for Educational Communications and Technology*. D.H. Jonassen (ed.) NY: Simon & Schuster

Pennsylvania Department of Education. (2001). *Academic Standards for Environment and Ecology.* http://www.pde.psu.edu/standard/ecology.pdf

Pennsylvania Department of Education. (2001). *Academic Standards for Sciences and Technology. Online:* http://www.pde.psu.edu/standard/science.pdf

Seels, B. B. & Richey, R. C. (1994). *Instructional Technology: The Definition and Domains of the Field.* Washington, DC: Association for Educational Communications and Technology.

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